Table 9a.–Standard error of the percent of public schools having access to the Internet, by the extent of wide area network use by members of the school community and by school characteristics: 1995

School characteristic	Members of the school community								
	Administrative staff			Teachers			Students		
	Not at all	Small extent	Moderate or large extent	Not at all	Small extent	Moderate or large extent	Not at all	Small extent	Moderate or large extent
All public schools	2.0	2.4	1.9	1.6	2.3	2.2	2.6	2.6	2.2
Instructional level*									
Elementary	2.9	3.6	2.5	2.4	3.3	2.7	3.5	3.7	2.6
Secondary	2.6	3.1	2.5	2.0	3.0	3.1	3.2	3.6	2.9
Size of enrollment									
Less than 300	4.8	5.9	4.7	4.2	5.0	6.0	5.2	5.0	4.7
300 to 999	2.8	3.3	2.4	2.1	3.0	2.6	3.3	3.3	2.2
1,000 or more	4.1	4.8	3.1	2.7	4.1	4.2	4.7	4.8	4.2
Metropolitan status									
City	5.9	6.1	4.3	3.9	5.8	4.4	5.9	5.4	3.9
Urban fringe	4.0	4.4	3.3	3.3	4.5	4.0	4.4	5.0	3.9
Town	4.9	5.1	3.8	3.3	4.8	4.5	4.8	5.3	4.2
Rural	3.6	4.9	3.9	3.4	5.0	4.9	4.4	4.8	3.6
Geographic region									
Northeast	5.0	5.7	3.8	3.5	5.5	4.6	5.6	5.7	4.7
Southeast	5.6	5.3	2.9	4.4	5.3	4.5	6.5	6.2	4.2
Central	3.9	4.6	3.6	3.5	4.3	3.8	4.7	4.7	3.4
West	3.1	4.3	3.7	2.4	4.9	4.5	4.3	4.2	3.7
Percent minority enrollment									
Less than 6 percent	3.8	4.0	3.7	4.0	4.3	3.7	4.6	4.7	4.0
6 to 20 percent	4.2	5.4	4.3	2.2	5.3	5.2	4.3	5.3	4.6
21 to 49 percent	5.1	5.2	3.8	1.8	4.5	4.4	5.6	6.0	4.2
50 percent or more	5.8	6.6	4.0	3.9	6.3	6.2	6.1	6.4	4.1
Percent of students eligible for free or reduced-price lunch									
Less than 11 percent	3.8	2.0	3.7	3.1	4.7	4.9	4.7	5.2	5.0
11 to 30 percent	3.6	5.2	3.5	2.6	4.6	4.0	4.1	4.7	4.0
31 to 70 percent	3.6	4.1	2.9	3.2	4.5	4.4	4.5	3.9	3.3
71 percent or more	7.8	4.3	5.7	4.2	6.2	6.6	7.1	7.3	5.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 10a.--Standard error of the percent of public schools having access to the Internet, by type of wide area network connection and by school characteristics: 1995

School characteristic	Type of connection				
	Modem	SLIP/PPP	56Kb	T1	ISDN
All public schools	1.6	2.3	1.4	1.4	0.9
Instructional level					
Elementary	2.5	3.2	1.9	1.8	1.3
Secondary	2.6	2.8	2.5	1.6	1.1
Size of enrollment					
Less than 300	4.4	4.5	3.4	0.8	2.2
300 to 999	2.1	2.6	1.9	1.7	0.9
1,000 or more	4.9	4.4	2.7	3.4	1.3
Metropolitan status					
City	4.4	4.7	2.9	4.0	2.3
Urban fringe	3.5	4.2	2.6	2.2	1.2
Town	3.5	4.1	3.3	2.3	–
Rural	3.9	4.1	2.7	1.9	2.6
Geographic region					
Northeast	3.8	4.2	3.4	2.2	1.6
Southeast	4.7	5.3	2.6	3.4	2.7
Central	3.2	4.4	2.1	2.1	0.6
West	3.4	2.9	3.3	1.9	1.7
Percent of minority enrollment					
Less than 6 percent	3.6	4.0	3.0	1.6	2.2
6 to 20 percent	3.9	3.1	3.4	2.9	0.7
21 to 49 percent	2.8	4.9	3.7	3.2	2.3
50 percent or more	4.0	4.1	2.9	2.9	2.2
Percent of students eligible for free or reduced-price lunch					
Less than 11 percent	4.0	4.6	4.1	2.2 *	–
11 to 30 percent	3.8	3.8	2.3	2.5	0.7
31 to 70 percent	2.2	3.3	2.5	1.7	1.4
71 percent or more	5.5	6.2	4.0	5.5	4.9

–Estimate of standard error is not derived because it is based on a statistic estimated at less than 0.5 percent or at 100 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 11a.--Standard error of the percent of public schools having access to the Internet, by type of network administrator and by school characteristics: 1995

School characteristic	Type of network administrator			
	Full-time network administrator	Part-time network administrator	No single individual	District staff
All public schools	1.5	2.5	2.1	2.0
Instructional level				
Elementary	2.2	3.4	2.9	2.7
Secondary	2.2	3.3	2.5	2.6
Size of enrollment				
Less than 300	3.6	5.5	4.3	4.6
300 to 999	1.9	3.2	2.7	2.6
1,000 or more	3.3	4.6	3.6	3.9
Metropolitan status				
City	2.8	4.7	4.3	4.3
Urban fringe	2.4	4.8	4.3	4.5
Town	4.7	5.5	3.2	5.0
Rural	2.2	5.0	3.6	4.0
Geographic region				
Northeast	3.9	5.8	4.6	4.0
Southeast	3.5	5.2	5.3	4.9
Central	2.6	4.0	3.7	3.9
West	2.4	5.3	3.5	3.7
Percent of minority enrollment				
Less than 6 percent	3.4	4.3	3.7	3.4
6 to 20 percent	3.1	4.7	4.5	4.5
21 to 49 percent	2.7	5.0	4.1	4.0
50 percent or more	2.4	7.2	5.0	5.8
Percent of students eligible for free or reduced-price lunch				
Less than 11 percent	3.3	5.5	4.9	4.8
11 to 30 percent	3.2	4.5	4.3	3.2
31 to 70 percent	2.7	4.4	3.5	3.7
71 percent or more	2.7	9.1	7.4	7.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 12a.–Standard error of the percent of public schools reporting the extent of the formal role that various groups have in developing the school's advanced telecommunications activities, by various groups: 1995

Various groups	Small or no extent	Moderate extent	Large extent
Students	1.1	1.2	0.4
Teachers/staff	1.4	1.5	1.9
Parents	2.0	1.9	0.9
School district	1.1	1.4	1.7
State education agency	1.7	1.3	1.3
Regional associations	1.5	1.3	0.8
Business leaders	1.3	1.2	0.7
Institutions of higher education	1.2	1.1	0.7
Other community organizations	1.4	1.2	0.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 13a.–Standard error of the percent of public schools that do not currently have access to the Internet and their plans to obtain access to the Internet, by school characteristics: 1995

School characteristics	No current Internet access	Planning Internet access in future	Type of access planned			No plans for future Internet access
			Direct	Other WAN	Both	
All public schools	1.8	2.4	2.9	2.0	1.5	2.4
Instructional level						
Elementary	2.4	2.9	3.3	2.4	1.7	2.9
Secondary	2.7	3.3	4.2	3.2	3.4	3.3
Size of enrollment						
Less than 300	3.9	5.1	5.6	3.8	2.8	5.1
300 to 999	2.2	3.1	3.9	3.1	2.1	3.1
1,000 or more	4.1	5.3	7.5	5.4	3.5	5.3
Metropolitan status						
City	4.3	4.8	6.0	3.9	4.3	4.8
Urban fringe	3.8	6.1	6.2	5.7	3.6	6.1
Town	3.7	5.1	5.1	4.5	2.4	5.1
Rural	3.8	4.5	5.6	3.8	2.7	4.5
Geographic region						
Northeast	5.3	7.0	6.3	4.9	4.1	7.0
Southeast	3.3	4.8	5.5	4.5	3.2	4.8
Central	3.3	5.0	5.4	3.9	2.7	5.0
West	3.4	4.1	5.4	4.2	3.2	4.1
Percent minority enrollment						
Less than 6 percent	3.3	5.2	5.9	3.9	3.0	5.2
6 to 20 percent	4.4	5.2	6.5	4.7	2.2	5.2
21 to 49 percent	4.0	5.7	6.0	6.8	5.3	5.7
50 percent or more	3.8	4.4	4.7	4.3	2.9	4.4
Percent of students eligible for free or reduced-price lunches						
Less than 11 percent	3.5	8.6	8.4	4.5	3.5	8.6
11 to 30 percent	3.6	5.1	6.1	4.6	3.7	5.1
31 to 70 percent	2.9	4.1	4.4	3.6	2.7	4.
71 percent or more	4.3	4.3	4.7	4.5	2.8	4.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995

Table 14a.—Standard error of the percent of all public schools indicating the extent to which various factors are barriers to either the acquisition or the use of advanced telecommunications: 1995

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	1.9	1.9	1.8
Inadequate hardware upkeep and repair	1.7	1.5	1.5
Too few telecommunication access points in building	1.7	1.6	1.7
Problems with telecommunications service provider	1.7	1.3	1.1
Lack of instructional software	1.9	1.7	1.4
Software too complicated to use	1.6	1.5	1.0
Lack of time in school schedule	2.2	1.7	1.8
Telecommunications links not easily accessible	1.8	1.5	1.5
Telecommunications equipment not easily accessible	2.0	1.6	1.6
Lack of technical support or advice	1.9	1.5	1.9
Lack of administrative support or initiative	1.6	1.5	1.2
Lack of or inadequately trained staff	1.9	1.5	1.7
Lack of teacher interest	1.6	1.4	0.7
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	2.0	1.7	1.7
Lack of student interest	0.9	0.7	0.5
Lack of parent or community interest	1.5	1.4	0.7
Not enough help for supervising student computer use	2.4	1.8	1.7
Concern about student access to inappropriate materials	1.9	1.4	1.4
Funds not specifically allocated for telecommunications	1.7	1.4	1.7
Variability of telecommunications rates from service providers	1.8	1.6	1.3
Use of advanced telecommunications does not fit with the educational policy of this school	1.0	0.9	0.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 15a.—Standard error of the percent of public schools currently having access to the Internet by the extent to which various factors are barriers to upgrading or maximizing the use of their advanced telecommunication capabilities: 1995

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	3.0	2.6	2.7
Inadequate hardware upkeep and repair	2.4	2.1	1.8
Too few telecommunication access points in building	2.4	2.0	2.8
Problems with telecommunications service provider	1.9	1.6	1.3
Lack of instructional software	2.4	2.2	1.4
Software too complicated to use	1.9	1.9	1.1
Lack of time in school schedule	3.3	2.2	2.7
Telecommunications links not easily accessible	2.8	2.0	2.4
Telecommunications equipment not easily accessible	2.8	2.1	2.5
Lack of technical support or advice	2.7	2.1	2.0
Lack of administrative support or initiative	2.1	2.0	1.4
Lack of or inadequately trained staff	2.9	2.5	2.5
Lack of teacher interest	1.9	1.6	1.1
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	2.6	2.5	2.5
Lack of student interest	1.2	1.0	0.6
Lack of parent or community interest	2.1	1.8	0.9
Not enough help for supervising student computer use	3.0	2.8	1.8
Concern about student access to inappropriate materials	2.6	2.2	1.7
Funds not specifically allocated for telecommunications	2.5	2.1	2.4
Variability of telecommunications rates from service providers	2.2	2.0	1.7
Use of advanced telecommunications does not fit with the educational policy of this school	1.3	1.2	0.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Table 16a.—Standard error of the percent of public schools that do not currently have access to the Internet, by the extent to which various factors are barriers to their acquisition of advanced telecommunication capabilities: 1995

Barrier	Minor or no barrier	Moderate barrier	Major barrier
Lack of or poor equipment	2.6	2.7	2.6
Inadequate hardware upkeep and repair	2.5	2.1	2.4
Too few telecommunication access points in building	2.5	2.4	2.5
Problems with telecommunications service provider	2.6	1.9	2.0
Lack of instructional software	2.4	2.1	2.4
Software too complicated to use	2.3	2.0	1.7
Lack of time in school schedule	2.5	2.2	2.4
Telecommunications links not easily accessible	2.2	2.2	2.3
Telecommunications equipment not easily accessible	2.2	2.3	2.5
Lack of technical support or advice	2.5	2.5	2.8
Lack of administrative support or initiative	2.5	2.1	1.8
Lack of or inadequately trained staff	2.4	2.2	2.5
Lack of teacher interest	2.4	2.3	1.1
Lack of teacher awareness regarding ways to integrate telecommunications into curriculum	2.6	2.3	2.4
Lack of student interest	1.1	0.9	0.7
Lack of parent or community interest	2.0	1.9	1.1
Not enough help for supervising student computer use	3.1	2.2	2.6
Concern about student access to inappropriate materials	2.8	2.1	2.0
Funds not specifically allocated for telecommunications	2.2	1.7	2.4
Variability of telecommunications rates from service providers	2.7	2.3	1.9
Use of advanced telecommunications does not fit with the educational policy of this school	1.6	1.5	0.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 57, 1995.

Appendix B

Reference Tables

Table 5b2.--Standard error of the percent of public schools having access to the Internet by the number and mean number of instructional rooms connected to the Internet, by school characteristics: 1994

School characteristic	Number of instructional rooms					Mean number of instructional rooms
	0 rooms	1 room	2-3 rooms	4 rooms	5 or more rooms	
All public schools	1.9	2.6	2.3	1.1	1.3	0.3
Instructional level						
Elementary	3.0	3.6	2.9	1.5	1.7	0.3
Secondary	1.8	3.3	2.8	1.6	1.5	0.5
Size of enrollment						
Less than 300	4.5	5.7	5.4	3.6	2.5	0.3
300 to 999	2.4	3.6	2.6	1.1	1.6	0.4
1,000 or more	1.9	4.0	3.8	1.6	1.9	0.7
Metropolitan status						
City	3.5	4.7	3.7	1.5	2.7	0.7
Urban fringe	3.1	5.1	4.7	2.0	2.5	0.7
Town	2.7	5.4	3.9	2.2	2.4	0.7
Rural	3.9	5.4	4.0	3.2	2.5	0.3
Geographic region						
Northeast	3.3	5.5	5.2	0.9	3.0	0.6
Southeast	2.6	6.7	6.4	1.2	1.6	0.4
Central	4.0	4.2	4.2	2.9	1.8	0.7
West	2.6	4.3	3.1	1.9	3.0	0.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 7a.

Table 5b1.--Percent of public schools having access to the Internet by the number and mean number of instructional rooms connected to the Internet, by school characteristics: 1994

School characteristic	Number of instructional rooms					Mean number of instructional rooms
	0 rooms	1 room	2-3 rooms	4 rooms	5 or more rooms	
All public schools	9	51	27	5	8	2.9
Instructional level*						
Elementary	11	52	25	4	7	2.5
Secondary	6	47	32	6	9	3.5
Size of enrollment						
Less than 300	12	51	24	7	6	1.9
300 to 999	9	51	28	4	9	3.1
1,000 or more	6	50	29	5	10	3.7
Metropolitan status						
City	11	48	28	3	9	3.2
Urban fringe	6	51	29	4	10	3.4
Town	6	57	24	6	7	3.0
Rural	13	47	26	6	7	2.0
Geographic region						
Northeast	6	55	27	2	9	2.4
Southeast	7	55	31	3	4	2.1
Central	13	48	29	6	5	2.8
West	9	48	24	6	12	3.6

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to the Internet--35 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994; table 7.

Table 8b1.—Percent of public schools having access to the Internet, by various types of Internet capabilities and for whom in the school community the capability is available: 1994

Internet capabilities	Available	Members of school community[2]		
		Administrative staff	Teachers	Students
E-mail	90	79	85	43
News groups	64	70	94	52
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	62	72	92	52
Graphical user interface (e.g., MOSAIC)	21	66	91	54

[1]Percents in this column are based upon the number of schools having access to the Internet–35 percent of public schools.

[2]Percents in these columns are based upon the number of schools with each Internet capability.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 6.

Table 8b2.--Standard error of the percent of public schools having access to the Internet, by various types of Internet capabilities and for whom in the school community the capability is available: 1994

Internet capabilities	Available	Members of school community[2]		
		Administrative staff	Teachers	Students
E-mail	1.4	1.8	1.8	2.8
News groups	2.9	2.5	1.3	3.1
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	2.7	2.5	1.7	3.4
Graphical user interface (e.g., MOSAIC)	1.5	5.3	2.8	6.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 6a.

Table 10b1.--Percent of public schools having access to any wide area network, by type of connection and by school characteristics: 1994

School characteristics	Type of connection				
	Modem	T1	56Kb	SLIP/PPP	Other
All public schools	97	3	4	3	4
Instructional level*					
Elementary	97	2	3	2	3
Secondary	97	3	5	5	4
Size of enrollment					
Less than 300	97	2	2	1	2
300 to 999	97	3	4	3	4
1,000 or more	96	3	5	7	4
Metropolitan status					
City	97	5	3	3	4
Urban fringe	96	3	4	2	5
Town	98	1	4	5	3
Rural	97	1	4	3	3
Geographic region					
Northeast	98	2	4	2	2
Southeast	98	1	1	1	4
Central	96	1	4	5	4
West	97	6	5	3	5

*Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents do not sum to 100 because some schools reported more than one type of connection. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 8.

Table 10b2.–Standard error of the percent of public schools having access to any wide area network, by type of connection and by school characteristics: 1994

School characteristics	Type of connection				
	Modem	T1	56Kb	SLIP/PPP	Other
All public schools	0.7	0.8	0.7	0.6	0.8
Instructional level					
Elementary	0.9	1.0	1.0	0.9	1.1
Secondary	1.0	0.8	1.1	1.0	1.1
Size of enrollment					
Less than 300	1.6	1.2	1.4	0.6	1.0
300 to 999	0.9	1.0	1.0	0.8	1.2
1,000 or more	1.3	1.2	1.5	1.7	1.4
Metropolitan status					
City	1.5	1.8	1.3	1.3	1.6
Urban fringe	1.5	1.4	1.5	0.9	1.6
Town	1.2	0.6	1.3	1.7	1.5
Rural	1.3	0.9	1.6	1.3	1.1
Geographic region					
Northeast	1.2	0.8	1.6	1.4	1.3
Southeast	1.7	0.5	0.9	0.8	2.5
Central	1.4	0.6	1.3	1.4	1.3
West	1.3	1.9	1.4	1.0	1.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 8a.

Table 12b1.--Percent of public schools having access to any wide area network by the extent of the formal role in developing the school's telecommunications program, by various groups: 1994

Various groups	Small or no extent	Moderate extent	Large extent
Students	91	8	2
Teachers/staff	33	35	33
Parents	79	17	4
District/regional administrators	26	26	48
Business leaders	84	12	4
Institutions of higher education	81	14	5
Community organizations	88	8	4
State education agency	66	21	13

NOTE: Percents may not sum to 100 because of rounding. Percents in this table are based upon the number of schools having access to Internet or any other wide area network connection (e.g., CompuServe, America Online, Prodigy)--49 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 12..

Table 12b2.--Standard error of the percent of public schools having access to any wide area network by the extent of the formal role in developing the school's telecommunications program, by various groups: 1994

Various groups	Small or no extent	Moderate extent	Large extent
Students	1.3	1.2	0.5
Teachers/staff	1.9	1.8	2.0
Parents	2.1	1.9	0.7
District/Regional administrators	1.8	1.7	1.8
Business leaders	1.8	1.5	1.0
Institutions of higher education	1.5	1.4	0.9
Community organizations	1.3	1.0	0.7
State education agency	2.3	1.9	1.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, K-12," FRSS 51, 1994, table 12a.

Appendix C: Glossary of Terms

Terms Defined on the Survey Form

Advanced telecommunications - refers to modes of communication used to transmit information from one place to another including broadcast and interactive television, networked computers, etc.

Broadcast television - refers to network television such as NBC, CBS, etc.

Cable television - refers to subscription television such as CNN, Learning Channel, Discovery, etc.

Closed-circuit television - refers to the transmission of television on noncommercial lines (e.g., inhouse broadcast).

E-mail (Electronic mail) - refers to text messages transmitted across networks and usually accessible only by the addressee.

56Kb - refers to a digital transmission speed of 56 Kilo (thousand) bits per second.

Instructional rooms - refers to rooms in the school building used for any instructional purposes (includes classrooms, labs, media centers, art rooms, rooms used for vocational or special education, etc.).

Internet - refers to a network of networks all running the TCP/IP protocols, sharing the same underlying network address space as well as the same domain name space, and interconnected into a network of information.

ISDN (Integrated Services Digital Network) - refers to data communication that integrates voice and data.

Local area network - refers to the linkage of computers and/or peripherals (e.g., printer) confined to a limited area that may consist of a room, building, or campus that allows users to communicate and share information.

Modem - a device which connects between a computer and a phone line to translate between the digital sign of the computer and the analog signal required for telephone transmission.

Newsgroups - electronic conferences/discussion groups similar to maillists. Newsgroup messages, called articles, are not mailed to a subscriber's e-mailbox but are distributed to a subscribing system's news server. The single copy is then accessed by all users on their network-connected machines. Each newsgroup focuses on a subject area.

One-way video with two-way audio or two-way computer link - refers to the ability to transmit or receive picture in one direction with the capability to communicate in two directions (interactively) via computer or some audio method.

PPP (Point to Point Protocol) - refers to a protocol that allows a computer to use TCP/IP (Internet) protocols (and become a full-fledged Internet member) with a standard telephone line and a high speed modem. See SLIP.

SLIP (Serial Line Internet Protocol) - refers to a protocol that allows a computer to use TCP/IP (Internet) protocol using serial lines such as dial-up telephone lines. See PPP.

T1 rate - refers to a digital transmission speed of 1.544 Megg (million) bits per second.

Two-way video and audio - refers to the ability to transmit and receive picture and sound simultaneously in real time.

Wide area network - refers to a data communications linkage designed to connect computers over distances greater than the distance transmitted by local area networks (e.g., building to building, city to city, across the country, or internationally), that allows users to communicate and share information.

World Wide Web (WWW) - refers to a system that allows access to information sites all over the world using a standard, common interface called hypertex to organize and search information. It simplifies the process of finding a site, connecting, locating the appropriate documents and downloading the information through the use of a browser (e.g., Netscape, MOSAIC).

Terms Used in the Survey Report

Archie - a research tool on the Internet for finding network host computers that have programs or data files which can be transferred to your machine.

Browsers - software application that allows the user to access a server computer on the Internet (e.g., Netscape).

Gopher - software which permits searching files on the Internet on remote hosts using layered menus. Text from these files can be read online or the files can be transferred to your computer.

MOSAIC - World Wide Web browser or client capable to accessing data via protocols such as Gopher and World Wide Web directly and will receive and display a wide variety of data types.

Netscape - a browser software application that allows the user to access a server computer on the Internet.

VERONICA (Very Easy Rodent-Oriented Net-wide Index to Computerized Archives) - an Internet search tool that does keyword searches of indexes of Gopher documents at FTP and Telnet sites.

Sample Universe and Classification Variables

Common Core of Data (CCD) Public School Universe - a database containing 85,000 records, one for each public elementary and secondary school in the 50 states, District of Columbia, and 5 outlying areas, as reported to the National Center for Education Statistics by the State Education Agencies for 1992-93. Records on this file contain the state and federal identification numbers, name, address, and telephone number of the school, county name and codes for the state, school type, enrollment size, and other selected characteristics of the school.

Instructional level

Elementary - schools beginning with grade 6 or lower, but having no grade higher than 8.

Secondary - schools with no grade lower than 7.

Combined - all other regular schools.

Metropolitan status

City - a central city of a Standard Metropolitan Statistical Area (SMSA).

Urban fringe - a place within an SMSA of a large or mid-size central city and defined as urban by the U.S. Bureau of the Census.

Town - a place not within an SMSA, but with a population greater than or equal to 2,500, and defined as urban by the U.S. Bureau of the Census.

Rural - a place with a population less than 2,500 and defined as rural by the U.S. Bureau of the Census.

Geographic region

Northeast - Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Southeast - Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

Central - Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

West - Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming.

Appendix D: Survey Methodology and Data Reliability

Sample Selection

The sampling frame for the FRSS *Survey on Advanced Telecommunications in U.S. Public Schools, K-12*, was the 1992-93 list of public schools compiled by the National Center for Education Statistics (NCES). This complete file contains about 85,000 school listings and is part of the NCES Common Core of Data (CCD) School Universe. This frame includes 57,935 regular elementary schools, 18,673 secondary schools, and 1,785 combined schools in the 50 states and the District of Columbia. All regular elementary, middle, and secondary schools in the 50 states and the District of Columbia were included in the sampling frame. Special education, vocational, and alternative/other ungraded schools, schools in the outlying territories, and schools with the highest grade level below 1st grade were excluded from the frame prior to sampling. With these exclusions, the final sampling frame consisted of approximately 78,393 eligible schools.

The sample was stratified by instructional level (elementary, secondary, combined) and by geographic region (northeast, southeast, central, and west). Within each of the major strata, schools were sorted by metropolitan status (city, urban fringe, town, rural) and minority status (less than 50 percent white enrollment, 50 to 79.9 percent white enrollment, and 80 percent or more white enrollment). The allocation of the sample to the major strata was made in a manner that was expected to be reasonably efficient for national estimates, as well as for estimates for major subclasses.

Response Rates

In October 1995, survey forms (see appendix G) were mailed to 1,000 public school principals. Principals were asked to forward the questionnaire to the computer or technology coordinator or to whomever was most knowledgeable about the availability and use of advanced telecommunications at the school. The accompanying instructions requested that the school complete the survey form and return it by mail. Telephone followup was conducted with schools that did not complete the survey by mail. Six schools were found to be out of the scope of the study (because of closings), leaving 994 eligible schools in the sample. Data collection was completed in December. The survey response rate was 92.2 percent (917 schools divided by the 994 eligible schools in the sample). The weighted response rate was 92.1 percent.

Sampling and Nonsampling Errors

The responses were weighted to produce national estimates. The sample weights were the inverse probability of selection adjusted for nonresponse. The findings of this report are estimates based on the sample selected and, consequently, are subject to sampling variability.

The survey estimates are also subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage) errors, errors of reporting, and errors made in collection of the data. These errors may result in biased data. Nonsampling errors may include such problems as the differences in the respondents' interpretation of the meaning of the questions; memory effects; misrecording of responses; incorrect editing, coding, and data entry; differences related to the particular time the survey was conducted; or errors in data preparation. While general sampling theory can be used in part to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure and, for measurement purposes, usually require that an experiment be conducted as part of the data collection procedures or that data external to the study be used.

To minimize the potential for nonsampling errors, the questionnaire was pretested with school principals and computer/technology coordinators like those in the survey population. During the design of the survey and the survey pretest, an effort was made to check for consistency of interpretation of questions and terms and to eliminate ambiguous items or instructions. The questionnaire and instructions were extensively reviewed by the National Center for Education Statistics. Manual and machine editing of the questionnaire responses were conducted to check the data for accuracy and consistency. Cases with missing or inconsistent items were recontacted by telephone. Final item nonresponse ranged from 0.0 to 3.5 percent (for nearly all items, nonresponse rates were less than 1 percent). No items were imputed. All data were keyed with 100 percent verification.

Variances

The standard error is a measure of the variability of estimates due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true confidence interval. For example, the estimated percentage of schools reporting that they have access to the Internet is 50 percent, and the

estimated standard error is 1.8 percentage points. The 95 percent confidence interval for the statistic extends from [50 - (1.8 times 1.96)] to [50 + (1.8 times 1.96)], or from 46.5 to 53.5 percent.

Estimates of standard errors were computed using a technique known as jackknife replication. As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic (see Wolter 1985, Chapter 4; see Appendix F). To construct the replication, 40 stratified subsamples of the full sample were created and then dropped one at a time to define 40 jackknife replicates. A proprietary computer program (WESVAR), available from Westat, Inc., was used to calculate the estimates of standard errors. The software runs under IBM/OS and VAX/VMS systems.

Appendix E: Background Information

The survey was conducted under contract by Westat, Inc., using the NCES Fast Response Survey System (FRSS). Westat's Project Director was Elizabeth Farris, and the Associate Project Director and Survey Manager was Sheila Heaviside. Judi Carpenter was the NCES Project Officer. The data were requested by Linda Roberts of the U.S. Department of Education. Gerald Malitz at NCES coordinated the request for data and collaborated with Westat on the data analyses and report writing.

This report was reviewed by the following individuals:

Outside NCES

- Oona Cheung, Council of Chief State School Officers

Inside NCES

- Sue Ahmed, Statistical Standards and Methodology Division
- William Freund, Postsecondary Education Statistics Division
- Kerry Gruber, Elementary/Secondary Education Statistics Division
- Frank Johnson, Elementary/Secondary Education Statistics Division
- Marilyn McMillen, Elementary/Secondary Education Statistics Division

For more information about the Fast Response Survey System or the *Survey of Advanced Telecommunications in U.S. Public Schools, K-12*, contact Judi Carpenter, Elementary/Secondary Education Statistics Division, Office of Educational Research and Improvement, National Center for Education Statistics, 555 New Jersey Avenue, NW, Washington, DC 20208-5651, telephone (202) 219-1333.

Appendix F: References

The WESVAR Procedures. 1989. Rockville, MD: Westat, Inc.

Wolter, K. 1985. *Introduction to Variance Estimation*. Springer-Verlag.

Advanced Telecommunications in U.S. Public Schools, K-12, NCES 95-731.